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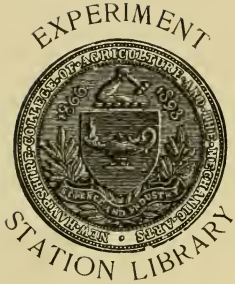

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A Winter Nest of the Brown-tail Moth

THE BROWN-TAIL MOTH IN NEW HAMPSHIRE

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NEW HAMPSHIRE COLLEGE
AGRICULTURAL EXPERIMENT STATION
In Co-operation with the
STATE BOARD OF AGRICULTURE
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FIG. 2.—Large Winter nest of Brown-tail Moth on a branch of a cultivated Cherry Tree. Slightly reduced.

THE BROWN-TAIL MOTH IN NEW HAMPSHIRE

By Clarence M. Weed, State Nursery Inspector

Southeastern New Hampshire is now infested by the Brown-tail Moth to an extent that threatens serious injury to the health and wealth of the people of the state, unless remedial measures are generally applied. This insect is capable of causing serious losses in various ways, and it behooves every citizen of the infested region to be constantly on the watch for it. Fortunately it is peculiarly open to destruction during all the winter months, on account of its curious habit of passing the winter in leafy nests on the ends of the branches of trees and shrubs. It has also food preferences among these trees and shrubs, which lead it as a rule first to appear on pear, wild cherry, apple, oak, and hawthorn. Consequently the people of an infested locality have long months to look for these winter nests, destroying them and thus leading to the extermination of the pest within their borders.

So far as known the first colony of Brown-tail Moths was found in New Hampshire December 7, 1899. It was taken in Seabrook, near the Massachusetts line, and is illustrated in the figure on page 48. Since then the pest has evidently been introduced again and again in different towns in the southern part of the state, so that it need occasion no surprise if it be found in almost any part of Rockingham, Hillsborough, or Strafford counties. There is in fact great danger of its being carried by electric cars, railroad trains, automobiles, and vehicles generally to other parts of New Hampshire, so that there is abundant occasion for every citizen of the state to be on the alert to suppress the pest at its first introduction. In a case

like this "a stitch in time" will save many times nine, for from a single colony this year there may easily be a hundred next year and ten thousand the year following.

During the period when there are no leaves upon the trees, the winter nests of this insect are easily recognized. They

The first nest
of the Brown-tail
Moth found in
New Hampshire
Pupils Fighting Brown-Tail Moths
Nearly a quarter of a million of the nests of the brown-tail moths have been collected by the Lynn school children within the past three weeks. The Lynn Board of Trade has offered a prize to the grammar school collecting the largest number of nests and another prize to the room in the school with the highest average per pupil. In the Cobbet School the average is 90 per pupil and in one of the parochial schools the average is over 200 per pupil. The trees of the city are very badly infested, and a crew of men is employed by the city in removing and burning the nests on the city's shade trees. Boston Transcript March 4, 1902
Taken at
Seabrook
Dec. 7, 1899

FIG. 3.—First Nest of Brown-tail Moth found in New Hampshire.

are composed of compact masses of leaves fastened together by a firm silken web, and inside these leaves there will be found two hundred or more small, brownish caterpillars. These leafy nests are especially likely to be fastened to the ends of branches, and are very conspicuous. When spring comes the little caterpillars leave the nests at the times when

they wish to feed, crawling down the twig to reach the near-by foliage. They return to their nests at night and when not feeding, so that in the spring of the year when the leaves are coming out, if one wishes to pick off the nests, one should be careful to do it at a time when the little caterpillars are present. But there is no excuse for waiting until spring to remove the nests.

These caterpillars continue to feed and grow until about the middle of June. Each then spins around itself a silken cocoon, the cocoon being attached to some convenient shelter, commonly the leaves of the food tree. Inside of these cocoons the caterpillars change to chrysalids, and three or four weeks later again change to the peculiar whitish moths, with a tuft of brown hairs at the end of the body of the females, which gives them the common name, Brown-tail Moth. These moths lay eggs in clusters of two or three hundred each on the leaves, generally near the ends of branches, and the latter part of summer these eggs hatch into small caterpillars, which feed upon the leaves, forming gradually the protective mass which remains upon the trees through the winter. The caterpillars remain inside the webbed leaves and thus wait until the advent of the following spring.

The caterpillars of this Brown-tail Moth feed upon a great variety of fruit and shade trees. At times they become frightfully destructive and their presence in many of the Massachusetts towns has been recognized as a grave public danger. Every place where a colony becomes established will serve as a centre of infestation for a new area, so that it is of vital importance that a lookout be kept, and at the first sign of the insect the outbreak be checked.

THE WINTER NESTS

The Brown-tail Moth is a pest much easier to control than the Gypsy Moth on account of its habit of passing the winter in the cocoon-like nests already mentioned. The recognition of these nests by the citizens of the state is now the most important thing in regard to the presence of these insects, and consequently I show in these pages photographic illustrations of a number of different types of them. In general they are

FIG. 4.—Hair-covered Egg-masses of Brown-tail Moth.

(*From Report of the Massachusetts State Board of Agriculture.*)

characterized by having a very dense and firm mass of silken web woven so tightly that it is difficult to pull it apart, with a few leaves attached more or less loosely to the outside. On being cut open it is seen that each nest contains many small cavities in which the young caterpillars are resting. The following notes on the nests illustrated may help to an understanding of what to look for:

The winter nest shown on the inside cover page was taken from a cultivated cherry tree near Hampton Beach. It was four and one half inches long by three inches wide, having comparatively few loose leaves, and an unusual amount of dense grayish silk showing on the outside. There were 305 small caterpillars in it.

The nest illustrated on page 52 was taken from a wild cherry shrub. The nest is five inches long by two inches wide where the dried leaves project. It is composed of a whitish silk web by means of which the leaf stems are firmly attached to the twig and nearly a dozen dried brown leaves from which the upper green surface had been eaten by the young caterpillars. It contained 261 caterpillars.

Rather a small nest of characteristic appearance is shown on page 53. It was taken from a wild cherry shrub, and measured $3\frac{1}{2}$ inches long by $2\frac{3}{4}$ inches wide. It had comparatively few loose leaves, and the supporting twigs were very thoroughly covered with silk. The web contained 137 young caterpillars.

An unusual form of winter web is illustrated on page 54. The young colony was situated at the end of a thrifty twig of plum tree in the nursery row, the twig having leaves of unusual length. Four or five of the leaves at the end were firmly attached to the branch by silken wrappings, and the green surfaces of the leaves were then bent over to form the framework of the winter nest, the outer dimensions of which were $3\frac{1}{2}$ by $2\frac{1}{2}$ inches. It contained 182 caterpillars.

The nest illustrated on the title page of this Bulletin serves to show very well the way in which the leaf stems are bound to the twig so that they cannot fall off during the winter. It is rather unusual that so many different fastenings should be made as in this case.

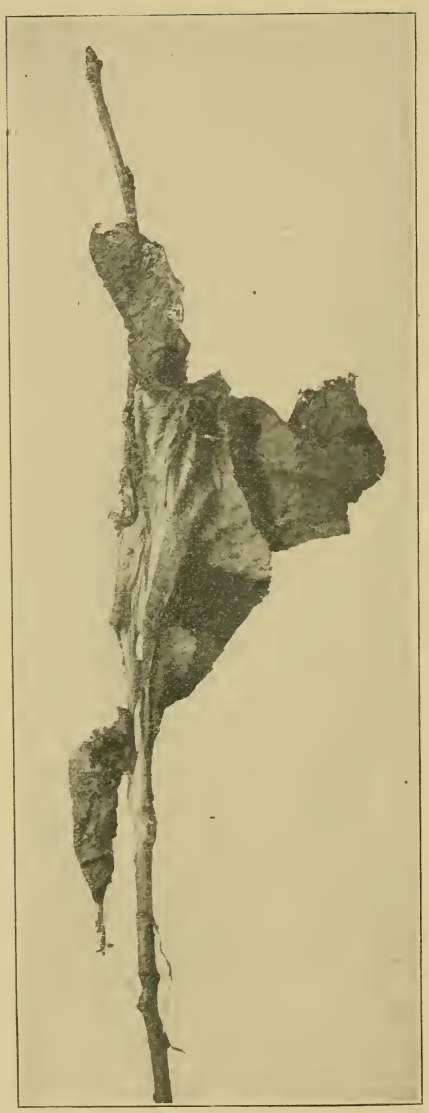

FIG. 5.—Winter Nest of Brown-tail Moth on Wild Cherry Twig.
Slightly reduced.

One of the most serious effects of the presence of the Brown-tail Moth in a community is that of the peculiar skin disease it may produce. Some of the hairs of the full-grown caterpillars are furnished with minute barbs. When the caterpillars molt these barbed hairs are shed with the skin, and as the skins become dry and are blown about by the wind the hairs may be quite generally disseminated. When the hairs alight upon the human skin they cause an irritation, which upon rubbing may develop into inflammation. In New Hampshire this phase of the insect's presence has already become evident. At Portsmouth a clothes-reel was near a tree infested by the caterpillars. The family were greatly troubled through the summer by extraordinary irritations of the skin, for which they were unable to account, but which were doubtless due to caterpillar hairs blown from the pear tree to the clothes upon the reel. In the same city a gentleman, in removing a caterpillar which had landed upon his neck, scattered some of the hairs, which produced an eruption similar to but considerably worse than that produced by poison ivy.

FIG. 6.—Winter Nest of Brown-tail Moth on a Wild Cherry Twig. Slightly reduced.

In Massachusetts, where the infestation has been longer known, this danger has become very generally recognized. The following experiences recorded in the report on the

Brown-tail Moth, by Messrs. Fernald and Kirkland, are simply examples of many others which have been reported to the authorities:

A lady in Somerville wrote: "We were shockingly poisoned by the caterpillars of the Brown-tail Moth. They troubled us all summer. Every member of my family was poisoned. At first we did not know what they were. My little boy could not go near the insects without getting poisoned,—every time he went to pick cherries he would come down from the tree badly poisoned. If my baby went near where they were, his face would break out into a rash. I was so dreadfully poisoned that I thought I had some frightful disease. My hands, face, and arms were broken out with this rash. Most of the caterpillars came from a neighbor's place. They came over the fence into the house, and even into the closets. They would get on the clothes hung on the line, and when these were worn they poisoned us."

FIG. 7.—Winter Nest of Brown-tail Moth on Young Plum Tree.

A Somervillle physician wrote: "The first we saw of these

moths was in 1897. The first cases of poisoning I saw were on Spring Hill road and Park street. I saw a number of cases, and they were all about the same, except that they varied in point of severity. Some of the cases were very obstinate, and did not respond well to treatment. The same symptoms developed in nearly all cases. The trouble began

FIG. 8.—Cocoon of Brown-tail Moth in Pear Leaves.

with an intense irritation, then an eruption appeared, resembling eczema, with a sort of watery blister on the top. There was intense irritation all over the body, on the head, arms, and limbs. I saw numbers and numbers of cases of this poisoning; I should say nearly a hundred cases in all came under my observation. The irritation seemed to remain and

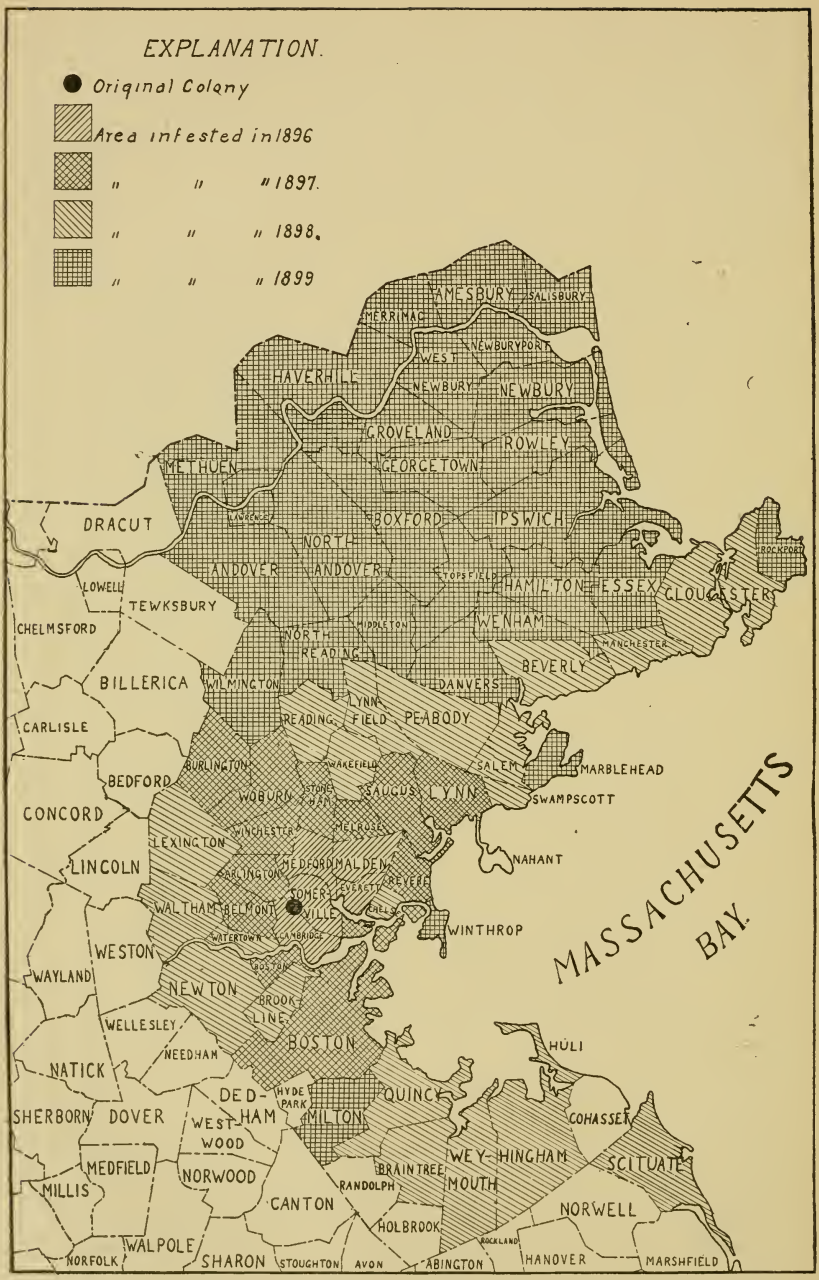

FIG. 9.—Area infested in Massachusetts in 1899.

(*From Report Massachusetts State Board of Agriculture.*)

was much worse than that caused by poison oak or poison ivy, and was not so easily gotten rid of. I treated most cases with some cooling application. Some cases were decidedly obstinate, but no case was serious enough to menace the life of the patient."

Investigations by Massachusetts authorities of this consequence of the presence of the Brown-tail Moth showed that it was due to the mechanical irritation of the barbs of certain short hairs on the body of the caterpillar; these hairs are called the nettling-hairs. "These nettling-hairs are very small, only about one two hundred and fiftieth of an inch in length, very sharp at one end, and with two or three barbs at the other end and many along the sides. These barbs are so arranged that when these nettling-hairs fall upon the skin any movement will cause them to work into the flesh. The nettling of the skin may be caused by contact with the caterpillars in either of the last two moults, the cocoons, and to some extent with the moths, but contact is not necessary, as these fine nettling spines may fall or be blown by the wind."

These nettling-hairs do not appear upon the insect until the caterpillar is nearly full grown, being present only during the last two moulting periods. Consequently there is no danger in removing or handling the winter nests in a locality where the pest has not been common the previous season.

TOWNS NOW INFESTED

Since early last spring we have found the Brown-tail Moth present in the following New Hampshire towns: Hampton, Hampton Falls, Portsmouth, Salem, Seabrook, and Stratham. It has been impracticable with the very small amount of money available for this purpose to make as thorough a survey as I should like to see made of the other towns in the southeastern part of the state. It is extremely probable that the pest exists in several of these where its presence has not yet been noticed. Greenland, Rye, and North Hampton are especially likely to be infested at an early date, if they are not already, while the towns along the Massachusetts border between Seabrook and Pelham are in great danger of infestation from the neighboring infested regions in Massachusetts.

FIG. 10.—Removing Brown-tail Moth Nests from a Massachusetts Orchard.
(*From Report of Massachusetts State Board of Agriculture.*)

The map on page 56 shows the area in that state infested by the Brown-tail Moth in 1899, and the insect presumably has spread to the west, as well as to the north, since that year.

The worst infestations we have located have been in Seabrook, Hampton, and the city of Portsmouth, in the latter especially along the car line from Rye. Mr. A. F. Conradi, then assistant entomologist, carried on the inspection work last spring, and did good service in calling the attention of local residents to the presence of the pest as well as in helping them to destroy it. An inspection this fall of part of the region gone over by Mr. Conradi showed that his work had been effective, for very few of the winter nests were found. This is the hopeful thing about the pest: the people of almost any community can keep it in check if they will only begin in time.

METHODS OF DISTRIBUTION

Various agencies may bring about the introduction of the Brown-tail Moth into new localities. The evidence in hand indicates that in our state the electric cars have been the most important means of distribution, as the nests in new localities have been quite generally found along the car lines. This is what might be expected, from the fact that these cars are continually coming from badly infested regions. They may bring to new localities either the egg-laden moths or the caterpillars. During the summer weeks when the moths are flying the lights of the cars are likely to attract them, so that the moths may be carried many miles before they leave the cars. In these new locations the moths may find pear or other trees on which to deposit their eggs, thus establishing new centers of infestation. The caterpillars, also, have a habit of dropping downward when disturbed, hanging by a thread. They may thus light upon a car or a waiting passenger, and be carried many miles before escaping.

In a less degree the freight and passenger trains of the railroads may easily serve to distribute the pest, as well as other sorts of vehicles. Violent wind storms are believed to have dispersed the egg-laden moths over a considerable territory.

There is also likely to be a gradual distribution from the natural flight of the moths, especially along lines of electric lights. These moths fly freely, and sometimes are carried considerable distances by the wind.

REMEDIAL MEASURES

Much the most important remedial measure now to be put in practice by the residents of the infested region is this:

Cut and Burn the Winter Nests

Do not cut and merely throw them on the ground. The caterpillars will not be killed by so doing. *Burn the nests*, preferably in a stove, for the webs are very resistant and must be thoroughly consumed to be sure that the caterpillars are killed.

In spring, after the leaves have come out, the caterpillars may be killed by spraying with arsenate of lead, but it is much better to check the outbreak in a newly infested community by the winter treatment recommended above.

There is no doubt that a law is needed in this state which will enable the local authorities to treat as common nuisances premises infested by this or any other newly introduced, dangerous pest in which the owner refuses or neglects to apply remedial measures. Such a statute would enable the local authorities to protect the neighborhood and the state at large. In Massachusetts this will probably be adopted as the solution of the vexed Gypsy Moth problem—a problem which it is only a question of time when the people of New Hampshire will also have to solve.

The only other insect nests present on our trees in winter that are at all likely to be confused with those of the Brown-tail Moth are the old, empty nests of the Fall Webworm and the Tent Caterpillar. These are larger, looser, and more weather worn, and *contain no living caterpillars*. If a web on a tree in winter contains small caterpillars, burn it, and clean the premises of all similar nests.

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